

**Finding of No Significant Impact**  
**for**  
***Biomass Gasification Demonstration Project***  
*Burlington, Vermont*

**AGENCY:** Department of Energy, Golden Field Office

**ACTION:** Finding of No Significant Impact

**SUMMARY:** The Department of Energy (DOE) has prepared an Environmental Assessment (EA) to provide the DOE and other public agency decision makers with the environmental documentation required to take informed discretionary action on the proposed Biomass Gasification Demonstration project. The EA assesses, the potential environmental impacts and cumulative impacts, possible ways to minimize effects associated with the proposed project, and discusses reasonable alternatives to the project. The DOE will use this EA as a basis for their decision to provide financial assistance to Future Energy Resources Corporation (FERCO), the project applicant. Based on the analysis in the EA, DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment, within the meaning of the National Environmental Policy Act (NEPA) of 1969. Therefore, the preparation of an environmental impact statement is not required and DOE is issuing this Finding of No Significant Impact (FONSI).

**COPIES OF THE EA ARE AVAILABLE FROM:**

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**BACKGROUND:** The Joseph C. McNeil Generating Station, which began operations in 1984, is a power plant that utilizes wood as its primary fuel for the production of electricity. The McNeil Station is jointly-owned by Burlington Electric Department, Green Mountain Power Corporation, Central Vermont Public Service Corporation, and Vermont Public Power Supply Authority (collectively referred to as the McNeil Joint Owners).

In March 1994, the joint owners of the McNeil Station entered into an agreement with FERCO for the development and commercial demonstration of biomass integrated gasifier/gas turbine technology. DOE entered into a cost share agreement with FERCO to assist in the development and commercialization of the proposed technology. The McNeil Joint Owners would make an "in-kind contribution" to the project by making available

to FERCO the McNeil Station's existing infrastructure, wood handling capacity, feedstock permits and contracts, waste and water treatment facility, emission monitoring and reporting, and general operating experience.

**PROPOSED ACTION:** The proposed action would demonstrate the technical and commercial viability of new state-of-the-art gasification technology and demonstrate the integration of the gasification process with a combustion turbine. The proposed project would consist of three phases. Phase I would consist of designing, engineering, and permitting a biomass gasifier. Phase II is intended to demonstrate the viability and efficiency of a biomass gasifier for the production of gas for use in the existing McNeil Station boilers. In Phase III, a gas combustion turbine would be installed to accept the product gas from the gasifier and form an integral part of a combined cycle system. Phase III is contingent upon the successful operation of Phase II and the need for increased electrical dispatch of the McNeil Station. Descriptions of Phases II and III follow.

**Phase II:** Phase II of the proposed project provides for the installation and operation of the biomass gasifier. The area proposed for erection and operation of the gasification unit is adjacent to the existing boiler building within the McNeil Station boundaries. The gasification unit would consist of a single, steel framed enclosed structure approximately 40 feet by 50 feet. The proposed gasifier would be designed to process up to 200 dry tons per day of woodchips. The gasification reactor would break down the biomass and converted it into

a medium Btu gas and residual char (charcoal). This process requires steam and hot sand which act as agents to convert the biomass into product gas.

The proposed gasification unit would be designed to produce a product gas of at least 400 to 500 Btu/scf (half the heating value of natural gas). The product gas would consist of a mixture of carbon monoxide, hydrogen, methane, and carbon dioxide and is particularly well suited as a substitute for natural gas. The product gas produced during operation of Phase II would be used in the existing boilers thereby displacing the equivalent heating value of wood or natural gas. During Phase II of the proposed project, no increase in the power output of the McNeil Station would be realized.

During operation of the gasification unit, waste material from the spent char and particles of ash would be separated from the flue gas and collected in an ash recovery cyclone before being disposed of offsite. The exhaust gas from the gasification unit would be directed to the existing McNeil Station and exit to the atmosphere through the existing on-site stack. A separate metal stack approximately 20 feet high and 20 inches in diameter, would be erected as a flare stack for emergency conditions. Under normal conditions, the product gas would be burned in the on-site boiler. In the event the boiler trips off-line while burning the product gas, the gasifier would stop operations diverting the "trapped" gas to the proposed emergency flare stack to be burned off.

Approximately 14-months have been scheduled for project permitting and for construction of the gasification unit with a schedule of approximately 8 to 10 months for the demonstration program.

**Phase III:** Phase III of the proposed project provides for the installation and operation of a gas combustion turbine (CT) generator which would be fueled by the product gas generated in the Phase II gasifier. The CT could generate up to an additional 15 MW of electrical capacity and related energy. At this time, FERCO is not requesting permitting approval from the State of Vermont for Phase III, therefore, detailed engineering or project planning has not been performed for Phase III of the proposed project.

Although the specific type of CT proposed for the project is not known at this stage of the planning process, state-of-the-art turbines are available for use in this type of process that are designed to achieve high efficiencies and low environmental emissions. CTs have been in use by utilities as peaking plants, operating a few hours a day during peak load conditions, for the past two to three decades. With the advent of more efficient turbines, and their installation into combined cycle configurations, their use as intermediate and baseload plants, designed to economically operate around the clock, has become feasible.

The CT portion of the facility would consist of the turbine; an electric generator; controls; a sound-attenuating, weather enclosure; and a concrete foundation. Air intake structures and exhaust systems would also be designed to reduce operational noise to acceptable levels as

prescribed by federal, state and local ordinances. The electrical output from the CT could be as much as 15 MW, however, it could be operated at lower output rating.

The fuel for the CT would be the same product gas used during Phase I operations, supplied from the gasifier. While the actual design and point of interconnections have not been established, the new gas/CT facilities could be easily installed within the boundaries of the McNeil Station, connecting to existing infrastructure adjacent to or near the site.

**ENVIRONMENTAL IMPACTS:** The EA for the proposed gasifier demonstration project assessed environmental impacts on air quality, socioeconomics, water quality and resources, transportation, noise, cultural resources, biological resources, land use, and socioeconomics. No impacts to air quality in the region are expected because the releases from the proposed actions would not exceed either state or Federal emission thresholds. Water resource requirements for the project would be met from existing on site sources and would not constitute a significant increase in demand. No significant change to quantity or quality of discharged water would occur. All physical and chemical discharge parameters would be within existing permit limits. Impacts resulting from transportation activities during construction and operations would be within those allowable under the state Certificate of Public Good. Noise from the proposed action would not be discernable from the existing facilities which are within allowable city limits. No significant increases in timber harvesting would occur from the addition

of the proposed project. Further, the minor increase when combined with the existing facility requirements would result in a total harvest of less than half of the maximum allowable by the state. The proposed facilities would be constructed within the boundaries of the existing facilities which consists of fill material devoid of significant cultural or biological resources. The existing facility is in compliance with local land use plans for the area, and because the proposed action is consistent with existing land use plans, the local planning commission has offered a waiver to the project. Project demands for construction and operational labor would be small and could be met from the local labor pool. As planned, the proposed action would not represent unfair or unequal treatment of low income or minority populations as required by E.O. 12898.

#### **ALTERNATIVES CONSIDERED:**

**No Action:** With the No Action Alternative, operations would continue similar to existing conditions, meeting electrical dispatch demands of the NEPP. Under the No Action Alternative, the objective and opportunity to demonstrate a superior gasification technology with higher conversion efficiencies using woodchips (biomass) would not be explored and the commercial viability of the proposed project's biomass gasification process would not be demonstrated. As such, the expected efficiencies and cost savings of the proposed project would not be realized.

**Other Alternatives:** The alternative of locating the proposed project independently to a new location other than the McNeil Station site was considered. The siting of an independent biomass gasifier at a new location to satisfy the objectives of the proposed project is considered economically infeasible. Capital costs for such a facility would be difficult to recover due to the need to develop new infrastructure, support facilities and purchase new equipment. The proposed action is intended to be a demonstration project which is based on a competitive proposal by FERCO in association with the McNeil Station joint-owners in response to a national solicitation by the DOE. The McNeil Station site offers several advantages to the proposed demonstration project. For example, the existing wood supply and infrastructure already provides a stable wood fuel to the gasification process. In addition, the familiarity of the McNeil Station operators with wood handling and combustion processes provides the required background for operation with a wood gasifier. Moreover, based on the construction of a biomass gasifier, associated support facilities, and other required infrastructure to support a totally independent gasifier environmental impacts would be expected to be greater than those from the proposed project.

The alternative of locating the proposed project at an existing facility other than the McNeil Station was also considered. The effects of siting a biomass gasifier and modifying an existing wood burning power plant to satisfy the objectives of the proposed project would be considered similar to the proposed project. Since the proposed project would not pose any adverse effects, the alternative of siting the



proposed project at another existing facility offers no distinct advantages over the McNeil Station site.

**DETERMINATION:** Based on the information in the EA, DOE determines that the proposed action, *Biomass Gasification Demonstration Project*, does not constitute a major Federal Action significantly affecting the quality of the human environment, within the meaning of the National Environmental Policy Act. Therefore, the preparation of an environmental impact statement is not required, and DOE is issuing this FONSI.

Issued in Golden, Colorado, this \_\_\_\_ day of \_\_\_\_\_. 1995.

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